Dairy Research Summary

DRECA
Dairy Research and Extension Consortium of Alberta

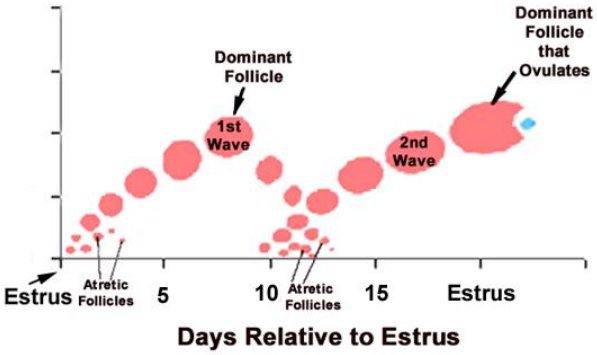
Vol 2 No 5

The Ovulatory Follicle in Dairy Cows: Size Matters

Dr. Marcos Colazo, Livestock Research Branch, Alberta Agriculture and Forestry

Why is this important?

Several studies have looked at the effect of the size of the ovulatory follicle on fertility, particularly in beef cattle. The ovulatory follicle is the structure in the ovary that releases the egg to be fertilized. In general, reducing the size of the follicle before ovulation has been shown to result in reduced blood estrogen concentrations prior to AI, reduced progesterone concentrations post AI and overall a poor conception rate. However, the association between ovulatory follicle diameter and pregnancy loss in lactating dairy cattle has not been reported.



What did we do?

We examined the factors affecting ovulatory follicle diameter and its association with pregnancy rate and pregnancy loss in lactating dairy cows subjected to two different timed-AI (TAI) protocols, either:

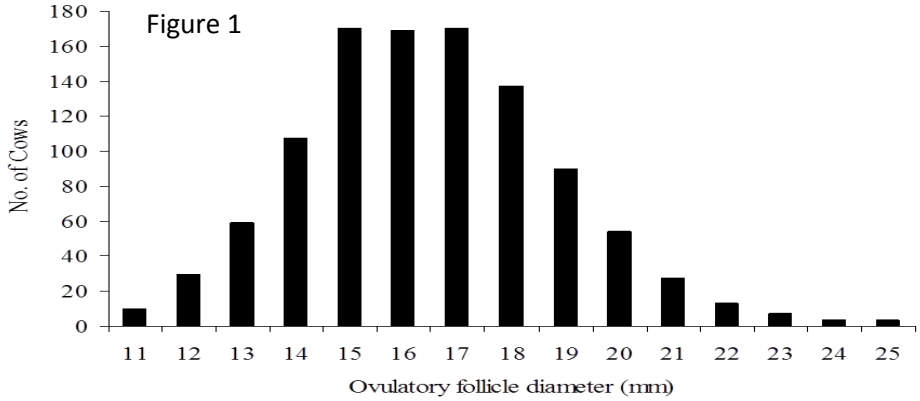
1) GnRH[1] – 5 d – 2 PGF[2] – 2.5 d – GnRH[1], or
2) GnRH[1] – 7 d – PGF[2] – 2.5 d – GnRH[1]

[1] GnRH – gonadotropin releasing hormone (Fertiline®)
[2] PGF – prostaglandin F2α (Estroplan® or Estrumate®)

Approximately half of the cows in both protocols were presynchronized, either with 2 PGF treatments 14 d apart or with an intravaginal device containing progesterone (PRID) between first GnRH and PGF.

Data from 1,576 breedings were examined. Only the information from cows that ovulated after TAI were evaluated (1,048 breedings). Diameter of the ovulatory follicle was measured by ultrasound at TAI and ovulation was determined 24 hours later. Pregnancy status was diagnosed by ultrasound at 32 and 60 days after TAI.

Figure 1



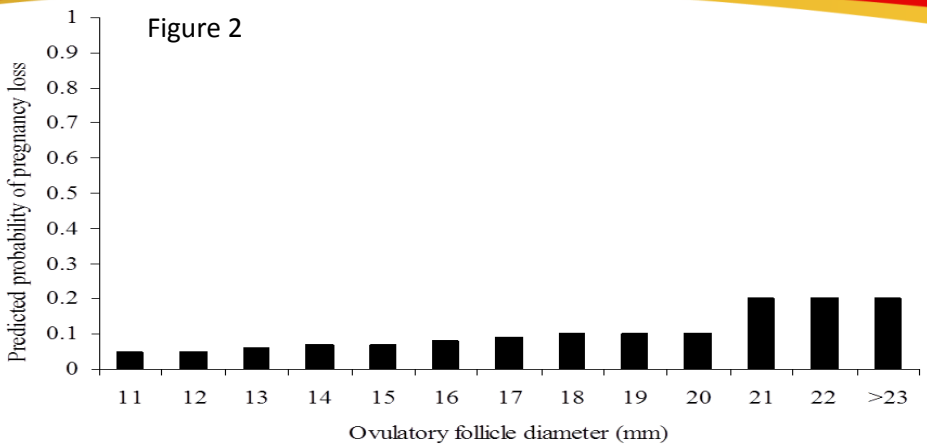


Figure 2

What did we find?

The diameters of ovulatory follicles among the 1,048 ovulations are illustrated in Figure 1. The minimum and maximum ovulatory diameters were 11 and 25 mm, respectively. The average ovulatory follicle diameter was 16.4 mm. Multiparous cows and those subjected to a 7-day TAI protocol had larger ovulatory follicles. Cows that ovulated after the first GnRH and those that were subjected to a 5-day TAI protocol had the smallest ovulatory follicles.

The overall pregnancy rate at 32 and 60 days after AI were 46 and 42%, respectively. Pregnancy loss between 32 and 60 days was 9%. The association between ovulatory follicle diameter and pregnancy status at 32 and 60 days after AI was not significant. However, a significant relationship between ovulatory follicle diameter and pregnancy loss between 32 and 60 d after TAI was observed; there was an increased probability of pregnancy loss in cows with ovulatory follicles greater than 20 mm in diameter (Figure 2). Surprisingly, smaller ovulatory sizes were not associated with reduced pregnancy rate or increased pregnancy loss as previously reported in beef cattle.

What does this mean?

Large ovulatory follicles were associated with increased pregnancy loss. Pregnancy loss negatively affects profitability of dairy herds, so increased importance should be placed on reducing the size of the ovulatory follicle in dairy cattle.

In herds that use TAI protocols for first service, the use of presynchronization strategies that improve the response to initial GnRH, would decrease the average size of the ovulatory follicle and reduce pregnancy loses. In second or greater services, where presynchronization is not practical to use, the utilization of a 5-d protocol would be beneficial in reducing ovulatory follicle size.

Summary Points

- The average ovulatory follicle diameter was 16.4 mm (range: 11 to 25).
- Response to initial GnRH and a 5-d TAI protocol reduced ovulatory follicle size.
- Ovulatory follicle size did not affect pregnancy rate at either 32 or 60 d.
- Ovulatory follicles larger than 20 mm were associated with increased pregnancy loss.

DRECA

Alberta Agriculture and Forestry

This research report is based on a previously published paper: Colazo et al. Theriogenology 2015; 84:377-383.
For further information please contact Dr. Colazo at marcos.colazo@gov.ab.ca
This research was supported by Alberta Agriculture and Forestry, Alberta Milk, Alberta Innovates – Bio Solutions and ALMA, Schering-Plough Animal Health, and Vetoquinol Canada Inc.The authors thank the management and staff of the DRTC, University of Alberta, Dairy Education and Research Centre, University of British Columbia, GreenBelt Farms, Wainwright, AB, and Breevliet Ltd, Wetaskiwin, AB for their cooperation, and care and management of the animals.